

Appendix B: Details of Stoves Tested

Traditional mud stove (TM) The wall thickness of the stove is about 3 cm. The height of the fire box (from the bottom of the stove to bottom of the pot) is about 18 cm. Fuelwood, crop residues and dung cakes are commonly used in this stove. A diagram is shown in **Figure B-2** and a photograph in **Figure B-1a**.

Three-rock arrangement (3-rock). To represent the three-rock arrangement, three bricks (6 cm × 22 cm x 11 cm) were arranged at approximately 120° to one another. The pot hole size was fixed as 190 mm diameter to keep 20 cm diameter pot. The stove can accommodate pots of 18-30 cm in diameter. **Figure B-3** shows the arrangement (see the photograph in **Figure B-1c**).

Improved Metal (IMet). The stove is cylindrically shaped with metal stands. The top a circular metal sheet is provided with a hole in the center and slots. A metal grate is provided at the bottom for airflow and to ensure smooth combustion. The stove can accommodate pots of 18-30 cm in diameter. The stove is specifically suitable for fuelwood and twigs. The stove is commercially available in the names of Priagni and Vishal. About 5 million stoves have been disseminated in all parts of the country. **Figure B-1d** shows a photograph of a typical version.

Improved Vented Mud (IVM) The stove is constructed with sundried prefabricated clay slabs (*chapris*). The slabs are made with a mixture of good clay and fibrous material such as chopped crop residues. Because of this the slab becomes strong and does not crack on drying. The stove consists of firebox, two potholes, connecting tunnel and chimney. The height from the firebox floor to the lower edge of the cooking hole is about 18 cm. The height of the tunnel from the ground level is about 2" (5 cm) at chimney and firebox ends. Whereas in the middle (at second pot hole) the height of the tunnel from the ground level is about 4.5"(11 cm). This rise helps in the maximum utilization of heat to the second pot. 3"(8 cm) inner diameter cement pipe is used as a chimney. Damper is provided between the second pothole and chimney to control the draft. The whole surface of the stove is coated with clay, dung and crop residue mixture. Fuels such as fuel wood, crop residues, and dungcakes can be used in this stove. The stove is mainly used in rural areas of India (see **Figure B-1f**).

Improved Vented Ceramic (IVC). This stove is commonly called "*Sugam*." The stove is same as IVM except the most critical four parts (two fireboxes, tunnel, and chimney) are made of ceramic. The ceramic lining helps in heat retention, which helps improve combustion and increases the efficiency of the stove. Presently the stove is disseminated in the villages of Uttar Pradesh.

Hara This dung-burning stove is widely used in villages of Haryana, Uttar Pradesh, Punjab and some parts of rural Rajasthan, Bihar and Madhya Pradesh. There are two designs of the Hara: One is portable, but heavy, and made of a mixture of mud, clay, and crop residue. The other is made of a similar mixture, but fixed in the ground. The portable version was chosen for the study and is shown in **Figures B-1b** and **B-4**.

Angethi. This bucket stove has a 23 cm top diameter; 12 cm bottom diameter, and a height of 17 cm. It is divided into two halves by a grate and the inner wall of the bucket is coated with

mud/concrete. There is a small air vent below the grate and three projections above the bucket to form the pot seat. Charcoal, coal, and coke are the major fuels burned in this stove. For the present study, charcoal and charbriquettes were tested. A diagram of the Angethi is given in **Figure B-1e** and a photograph in **Figure B-5**.

Kerosene wick. The weight of the empty stove is about 2.6 kg. The stove consists of fuel tank, burner assembly and load bearing assembly. The fuel tank capacity of the stove is 2 liters. The fuel tank is fitted with filter cap assembly, a kerosene level indicator (float) to indicate the level of kerosene in the tank, and a wick control lever designed for raising/lowering the wicks to control the intensity of the flame. The burner assembly consists of 10 wicks and inner and outer sleeves. The space between the two sleeves is designed to supply more pre-heated air to ensure better combustion. An insulated triple wall outer burner casing is provided to minimize the heat loss. At the top of the burner assembly a load-bearing assembly (26.5 cm) is placed to provide the platform for vessel. An optional triangular pan support is also provided to place small utensils. The stove is used in all parts of India especially in urban areas (see **Figure B-1h**).

Kerosene pressure. The major units of the stove are fuel container, roarer type burner, and a top ring. The fuel container is made up of brass sheet with a capacity of 2 liters. The fuel container is fitted with a hand-operated pump, pressure release screw, and fuel filler cap assembly. The pressure release screw is for releasing the container pressure quickly and safely. By decreasing the pressure the flame can be adjusted. The fuel container is fitted with a socket and a spirit cup. The fuel container rests on metallic legs, which are extended up to the top ring. The burner assembly consists of a nipple, burner, and a flame ring. The top ring (21 cm diameter) is placed on top of the burner assembly. **Figure B-1g** shows a diagram of the kerosene pressure stove. A schematic is given in **Figure B-6**.

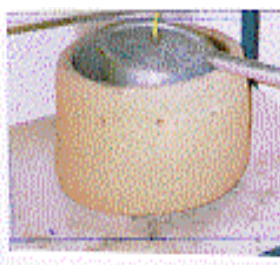
LPG stove. The stove is made up of stainless steel body for use with liquefied petroleum gases sold in refillable tanks at 2.5-3.4 kPa (kN/m^2) pressure. A tap is provided in the stove to control the pressure. If the tap is turned "full on" the intensity of the flame is high. A detachable metal frame is provided to support the pan. The stove is connected to the gas cylinder with rubber tubing. A detachable regulator is provided at the end of the tube to connect to the cylinder. There is a key in the regulator to control the supply of the gas from cylinder to the stove.

Biogas stove. There is a tap in the stove to control the intensity of the flame. The circular burner has three rows of 4.7 mm holes as follows:

	Pitch Hole Diameter (mm)	No. of holes
Inner row	40	6
Middle row	57	6
Outer row	72	23



a. Traditional mud stove



b. Hara



c. Three-rock

d . Improved metal



e. Angethi



f. Improved vented mud



g. Kerosene pressure

h. Kerosene wick

Figure B-1 (a-h). Photographs of the stoves tested in the study

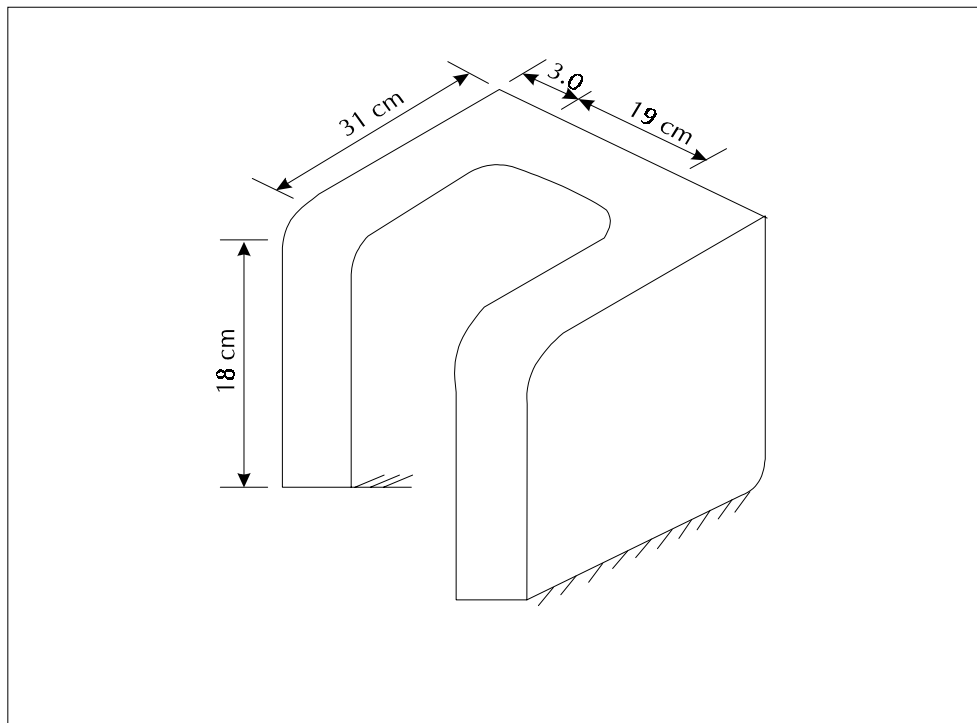


Figure B-2. Diagram of the traditional mud stove.

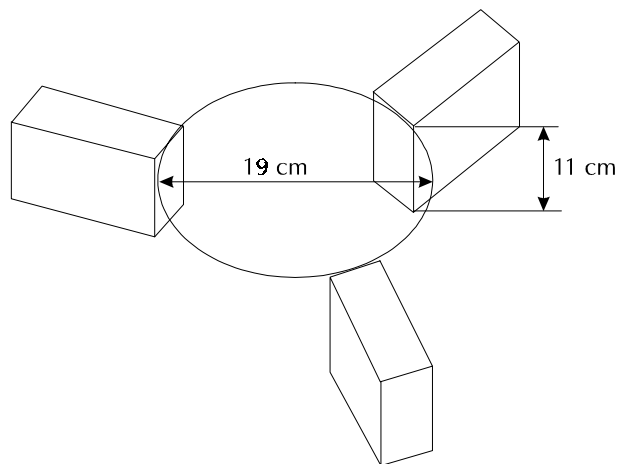


Figure B-3. Diagram of the three-rock stove.

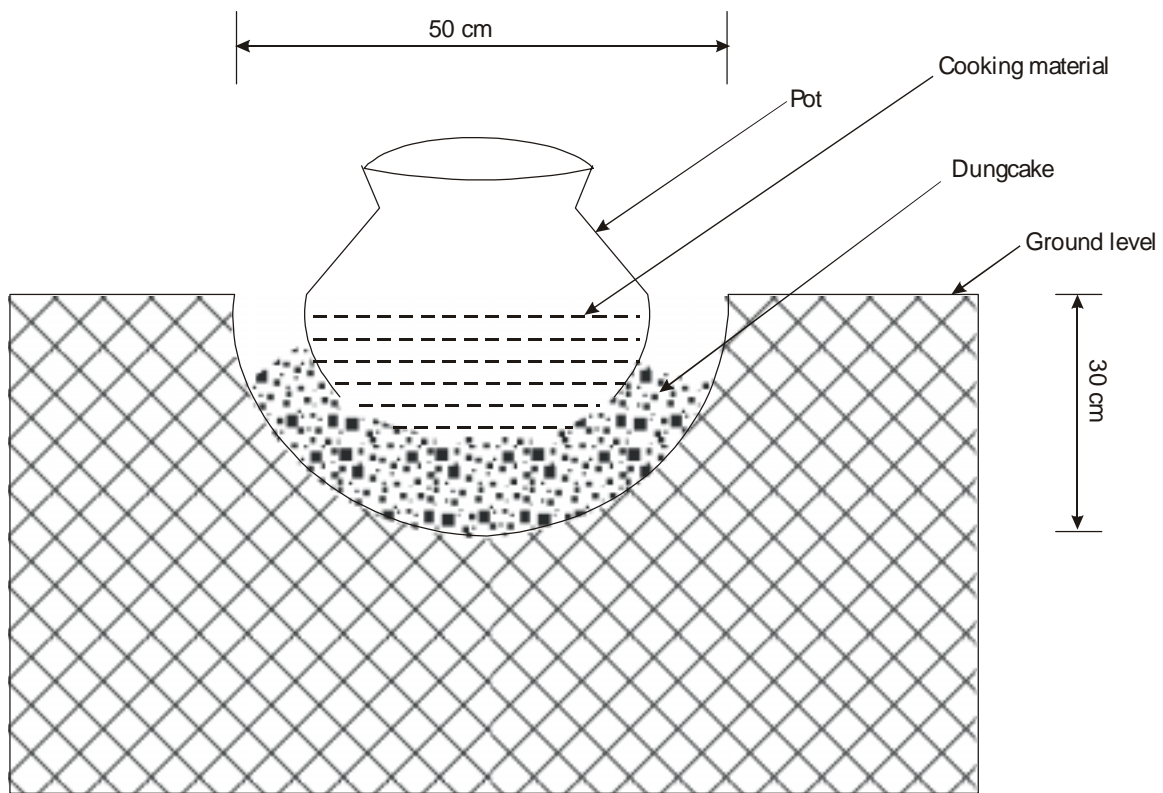


Figure B-4. Diagram of the hara stove.

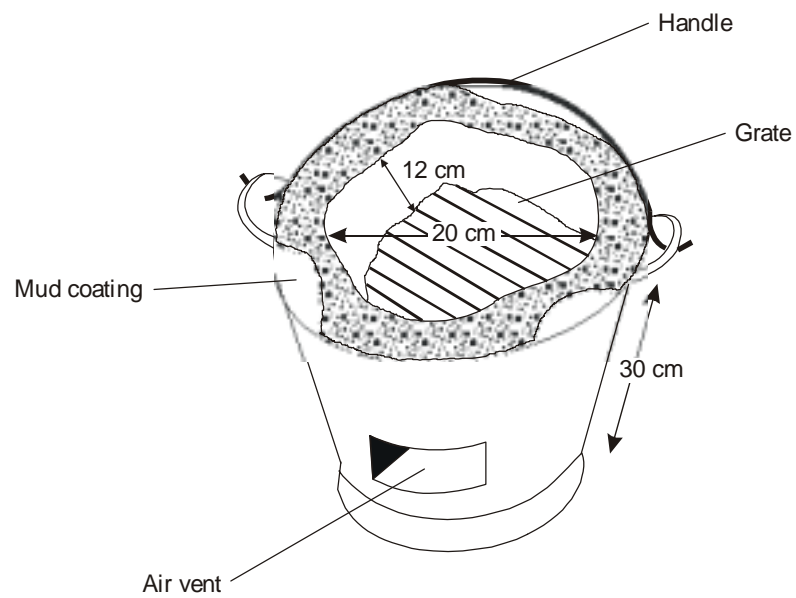


Figure B-5. Diagram of the Angethi stove.

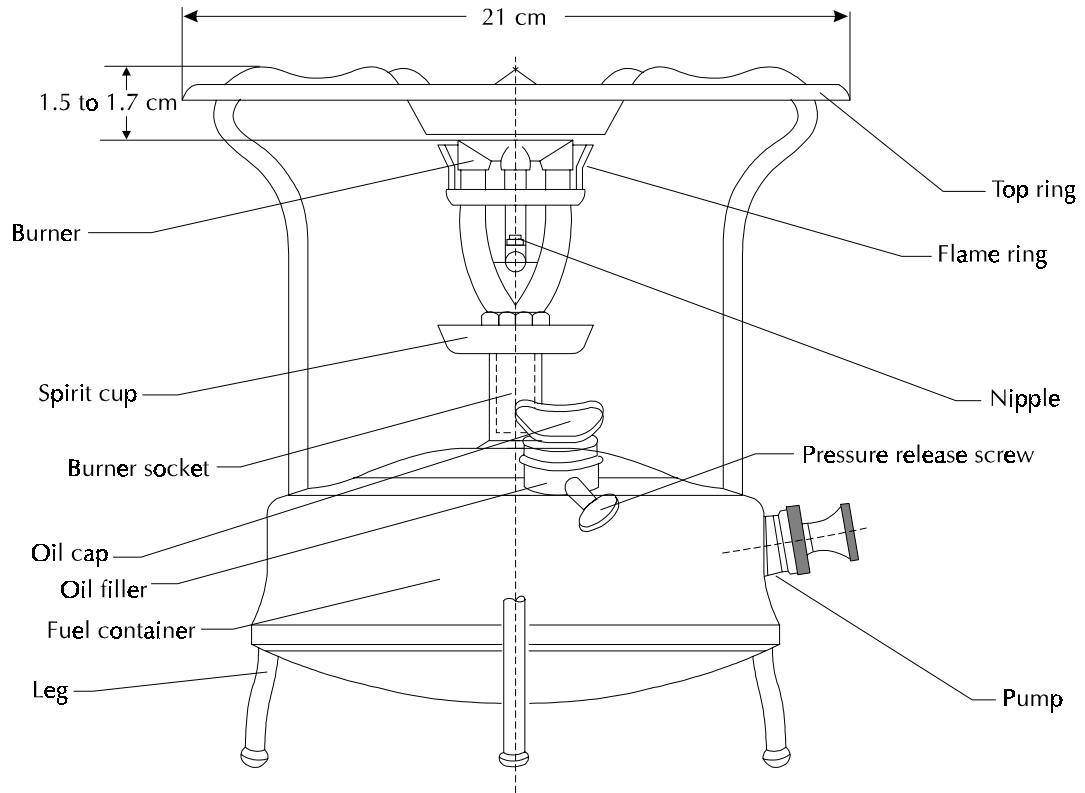


Figure B-6. Diagram of the kerosene pressure stove.